

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Mail Stop 2321
Gaithersburg, Maryland 20899

SRM Number: 2519
MSDS Number: 2519
SRM Name: Wavelength Reference
Cell – Hydrogen Cyanide Absorption

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Wavelength Reference Absorption Cell – Hydrogen Cyanide

Description: SRM 2519 is a sealed, optical-fiber-coupled absorption cell containing less than 1 mg of hydrogen cyanide ($H^{13}C^{14}N$) gas. The absorption cell material is fused silica. The cell is securely mounted in an aluminum holder.

Other Designations: Hydrogen Cyanide (hydrocyanic acid; prussic acid; anhydrous hydrogen cyanide; formonitrile, carbon hydride nitride).

Name	Chemical Formula	CAS Registry Number
Hydrogen Cyanide	HCN	74-90-8

DOT Classification: Hydrogen Cyanide, UN1051

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Hydrogen Cyanide	100*	OSHA TLV-TWA (skin): 11 mg/m ³ (10 ppm)
		ACGIH Ceiling (skin): 5 mg/m ³ (4.7 ppm)
		Human, Inhalation: TC _{LO} : 500 mg/m ³ /3 min
		Human, Inhalation: LC _{LO} : 400 mg/m ³ /2 min 120 mg/m ³ /1 hr

*Each SRM unit contains less than 1 mg of hydrogen cyanide gas.

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Hydrogen Cyanide
Appearance and Odor: colorless gas with an almond odor
Relative Molecular Mass: 27.03
Boiling Point: 26 °C
Freezing Point: -14 °C
Odor Threshold: 2 µmol/mol to 5 µmol/mol
Vapor Density (air = 1): 0.941 g/L
Vapor Pressure (20 °C): 620 mmHg
Water Solubility: miscible
Solvent Solubility: soluble in alcohol; slightly soluble in ether

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: -18 °C

Method Used: CC

Autoignition Temperature: 538 °C

Flammability Limits in Air (Volume %): **UPPER:** 40
LOWER: 5.6

Unusual Fire and Explosion Hazards: This material is a severe fire hazard when exposed to heat or flames. Vapor/air mixtures are explosive.

Extinguishing Media: For large fires, use regular foam or flood with fine water spray.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face shield in the pressure demand or positive mode and other protective clothing. Avoid inhalation of material or combustion by-product fumes.

SECTION V. REACTIVITY DATA

Stability: X **Stable** **Unstable**

Conditions to Avoid: Avoid contact with air, light, and sparks. Avoid heat, sparks, flames, and other sources of ignition; avoid contact with incompatible materials.

Incompatibility (Materials to Avoid): Hydrogen cyanide is incompatible with combustible materials, bases, amines, oxidizing materials, and acids.

See Section IV: "Fire & Explosion Hazard Data".

Hazardous Combustion Products: Thermal oxidative decomposition of hydrogen cyanide may produce carbon dioxide, toxic oxides of nitrogen, and carbon monoxide.

Hazardous Polymerization X Will Occur Will Not Occur

Hydrogen cyanide will polymerize with the evolution of heat.

See "Conditions to Avoid".

SECTION VI. HEALTH HAZARD DATA

Route of Entry: X Inhalation Skin Ingestion

Health Hazards (Acute and Chronic): Inhalation of low levels of hydrogen cyanide may result in irritation of the nose and throat, a bitter almond odor on the breath, a burning taste, feeling of constriction of the throat, blotchy skin eruptions of the face, salivation, nausea with or without vomiting, vertigo, headache, rapid pulse, or palpitations. Respiratory rate and depth usually increase initially, becoming slow and gasping. Massive doses may result in immediate unconsciousness, often with convulsions and death (see Section II: "Hazardous Ingredients"). Eye contact may cause irritation with redness and pain, as well as superficial keratitis. Hydrogen cyanide may be rapidly absorbed through the skin, with little or no irritating effects. Absorption of sufficient amounts may cause systemic effects as described for inhalation.

Medical Conditions Generally Aggravated by Exposure: Blood system disorders, heart or cardiovascular disorders, and nervous system disorders may be aggravated by hydrogen cyanide.

Listed as a Carcinogen/Potential Carcinogen:

	<u> Yes </u>	<u> No </u>
In the National Toxicology Program (NTP) Report on Carcinogens	<u> </u>	<u> X </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u> </u>	<u> X </u>
By the Occupational Safety and Health Administration (OSHA)	<u> </u>	<u> X </u>

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance immediately.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance immediately.

Ingestion: Not Applicable (gas)

TARGET ORGAN(S) OF ATTACK: upper respiratory tract (URT), eyes, and blood

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in Case Material is Released: Personnel should be protected against gas inhalation and eye contact. Ventilate closed spaces before entering. Remove leaking cell to an exhaust hood or safe outdoors area.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Provide general and local explosion-proof ventilation systems to maintain airborne concentrations below the TLV. Provide approved respiratory apparatus for non-routine or emergency use. Use an approved filter and vapor respirator when the vapor or mist concentrations are high. An eye wash station and washing facilities should be readily available near handling and use areas. Wash exposed skin areas several times a day with soap and warm water.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

This material is subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Store material in a cool, dry, well-ventilated area away from sources of heat, sparks, open flames, and oxidizing agents. Protect containers from physical damage.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Hydrogen Cyanide, Anhydrous, Stabilized*, 19 March 2003.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified values for this material are given on the NIST Certificate of Analysis.